REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
	Viewgraphs	

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
NexGenBus Brief (Viewgraphs)	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
Sid Jones	5e. TASK NUMBER
	5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
Naval Air Warfare Center Aircraft Division 22347 Cedar Point Road, Unit #6 Patuxent River, Maryland 20670-1161	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
Naval Air Systems Command 47123 Buse Road Unit IPT Patuxent River, Maryland 20670-1547	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Sid Jones
Unclassified	Unclassified	Unclassified	Unclassified	8	19b. TELEPHONE NUMBER (include area code) (301) 342-1601

Next Generation Instrumentation Bus

Sid Jones
NexGenBus Project Manager

10/7/99

Goal

- The goal of the NexGenBus Project is to establish a commercial communications bus as an interface standard for the test instrumentation system of the future.

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Background

- Current data requirements exceed the capacity of any single instr. bus
- Increased fusion of data from numerous sources
  - Analog measurements/Avionics busses/Radar data/Video/Voice
- Instrumentation vendors need a bus standard to base future products

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Background (cont.)

- Commercial standards show promise
- Leverage off comm industry investment
  - Standards development
  - Interface hardware design (chipsets to test sets)
  - Large production quantities
- Range Commander's Council (RCC) task TG-50 concluded existing busses looked feasible and recommended a task to establish an IRIG Bus Standard

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Project Description

- Office of Secretary of Defense (OSD) funded effort
  - Test Technology Development and Demonstration (TTD&D)
- Tri-service program participation
- The program is a three year effort
  - Year 1 - Define Requirements and research busses
  - Year 2 - Test and demonstrate bus(ses)
  - ➡ – Year 3 - Write Profile

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Completed Tasks

- Established bus requirements
- Located 33 possible commercial busses
- Identified 8 busses > 100Mbps
- Researched the 8 busses to determine 3 viable busses.
  - Fibre Channel ANSI X3.230
  - Gigabit Ethernet IEEE 802.3z
  - Firewire IEEE 1394

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Completed Tasks (cont)

- Down Select
  - The 3 busses were studied
  - Rated H/M/L for 13 criteria
    - » Data Rate / Synchronicity / Class of Service / Protocols / Working Groups / Topologies / etc.
  - Converted ratings to numbers (average)
    - » Fibre Channel 8.85
    - » Gigabit Ethernet 5.00
    - » Firewire 4.46

High: 10
Med: 5
Low: 1

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Selected Bus for Testing

- *Fibre Channel was selected for follow-on testing*
- Of the three busses,
  Fibre Channel is the only one being used in a military flight environment

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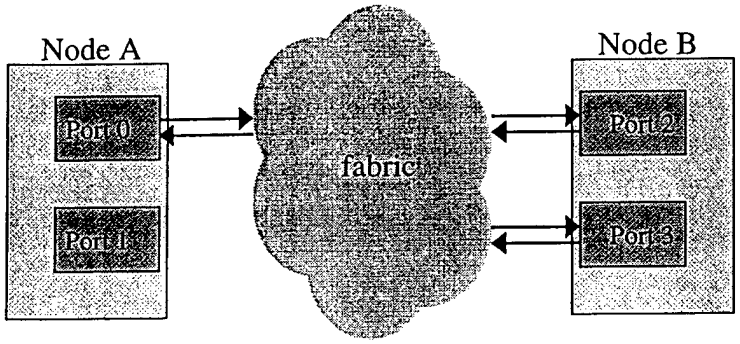
Fibre Channel: Nodes & Ports



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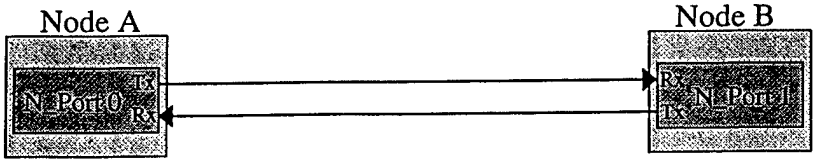
Fibre Channel: Topologies

Point-to-Point



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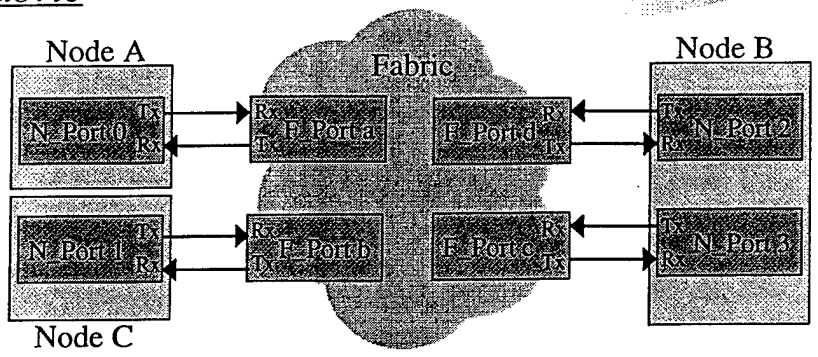
Fibre Channel: Topologies

Fabric



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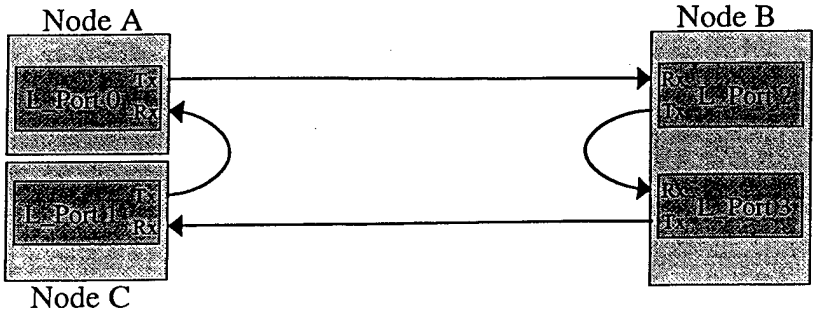
Fibre Channel: Topologies

Arbitrated Loop



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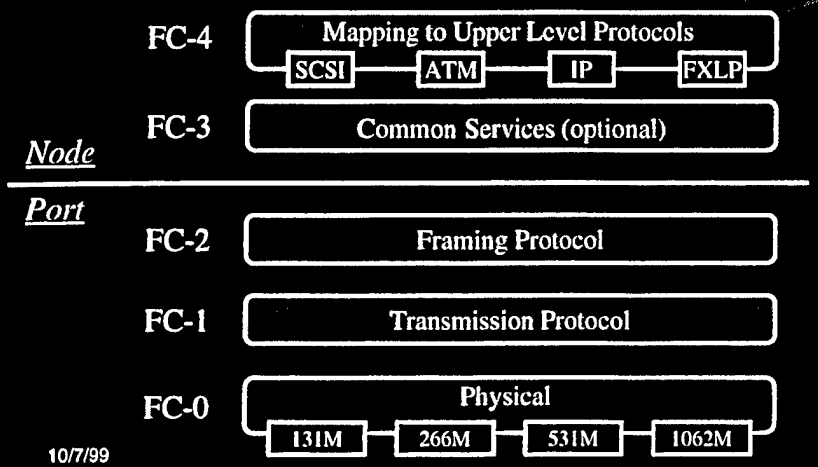
Fibre Channel Structure



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Avionics Working Group

- Technical Committee T11.4 sponsors a Fibre Channel Avionics Environment (FC-AE) group
- Produce a "Profile" using Fibre Channel in an avionics environment
  - Concerns they may be working toward non-standard approach

www.t11.org

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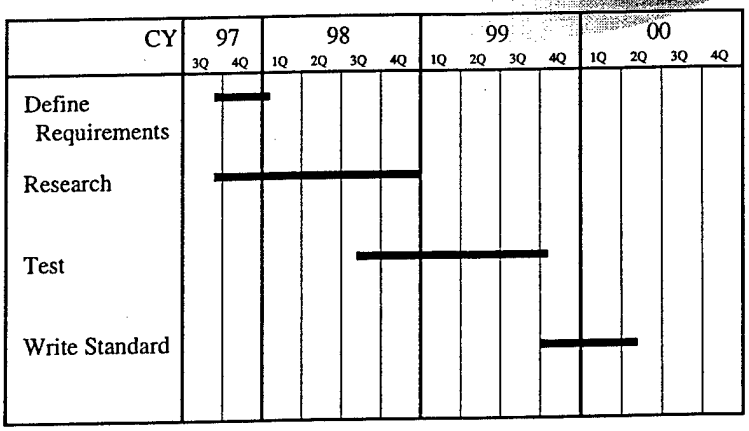
Schedule



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